We claim:

1. A FAFSD target peptide selected from the group consisting of SEQ ID NOS: 3, 6, 8, and a crossreactive and immunologically functional analogue thereof and mimetopes thereof.

2. A FAFSD target peptide according to claim 1 wherein the a crossreactive and immunologically functional analogue is selected from the group consisting of SEQ ID NOs: 4, 5, 86, 86 and 88.

3. A peptide immunogen comprising a helper T cell epitope sequence (Th) covalently attached to a FAFSD target peptide comprising no more than 30 amino acids of the carbohydrate binding pocket of FimH, or a crossreactive and immunologically functional analogue thereof, or a mimetope thereof.

4. A peptide immunogen according to claim 3 wherein the crossreactive and immunologically functional analogue is selected from the group consisting of SEQ ID NOs: 4, 5, 86, 86 and 88.

5. A peptide immunogen comprising a carrier protein covalently attached to a FAFSD target peptide comprising no more than 30 amino acids of the carbohydrate binding pocket of FimH, or a crossreactive and immunologically functional analog thereof, or a mimetope thereof.

6. A peptide immunogen according to claim 5 wherein the crossreactive and immunologically functional analogue is selected from the group consisting of SEQ ID NOs: 4, 5, 86, 86 and 88.

7. A peptide immunogen of claim 3 wherein the FAFSD target peptide is cyclized.

8. A peptide immunogen of claim 4 wherein the FAFSD target peptide is cyclized.

9. A peptide immunogen of claim 5 wherein the FAFSD target peptide is cyclized.

10. A peptide immunogen of claim 6 wherein the FAFSD target peptide is cyclized.

11. A peptide immunogen represented by the formulas

$(A)_n$-(FAFSD peptide)-$(B)_o$-$(Th)_m$-X

or

$(A)_n$-$(Th)_m$-$(B)_o$-(FAFSD peptide)-X

or

(FAFSD peptide)-$(B)_o$-$(Th)_m$-$(A)_n$-X

or

$(Th)_m$-$(B)_o$-(FAFSD peptide)-$(A)_n$-X

wherein

each A is independently an amino acid or an invasin domain;

each B is independently an amino acid or a chemical linker chosen from the group consisting of: amino acids, gly-gly, (α, ε-N) Lys, Pro-Pro-Xaa-Pro-Xaa-Pro (SEQ ID NO:73); $NHCH(X)CH_2SCH_2CO$-, -$NHCH(X)CH_2SCH_2CO$(ε-N)Lys-,-$NHCH(X)CH_2S$-succinimidyl(ε-N)Lys-, and -$NHCH(X)CH_2S$-(succinimidyl)-;

each Th is independently a sequence of amino acids that constitutes a helper T cell epitope, or an immune enhancing analog or segment thereof;

(FAFSD peptide) a FAFSD target peptide as defined in Claim 1;

X is α-COOH or α-$CONH_2$;

n is from 0 to about 10;

m is from 1 to about 4; and

o is from 0 to about 10.

12. A peptide immunogen of claim 11, wherein B is an amino acid selected from the group consisting of natural and unnatural amino acids.

13. A peptide immunogen of claims 3 wherein said Th is a combinatorial Th

epitope library.

14. A peptide immunogen of claims 4 wherein said Th is a combinatorial Th epitope library.

15. A peptide immunogen of claims 5 wherein said Th is a combinatorial Th epitope library.

16. A peptide immunogen of claims 6 wherein said Th is a combinatorial Th epitope library.

17. A peptide immunogen of claims 11 wherein said Th is a combinatorial Th epitope library.

18. A peptide immunogen of claim 3 wherein said Th has an amino acid sequence selected from the group consisting of SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NOS:38-39, and SEQ ID NOS:49-50, and SEQ ID NO:67.

19. A peptide immunogen of claim 4 wherein said Th has an amino acid sequence selected from the group consisting of SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NOS:38-39, and SEQ ID NOS:49-50, and SEQ ID NO:67.

20. A peptide immunogen of claim 5 wherein said Th has an amino acid sequence selected from the group consisting of SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NOS:38-39, and SEQ ID NOS:49-50, and SEQ ID NO:67.

21. A peptide immunogen of claims 6 wherein said Th has an amino acid sequence selected from the group consisting of SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NOS:38-39, and

SEQ ID NOS:49-50, and SEQ ID NO:67.

22. A peptide immunogen of claim 11 wherein said Th has an amino acid sequence selected from the group consisting of SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NOS:38-39, and SEQ ID NOS:49-50, and SEQ ID NO:67.

23. A peptide immunogen of claim 11 wherein said peptide immunogen has an amino acid sequence selected from the group consisting of SEQ ID NOs:74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84 and 85.

24. A peptide immunogen of claim 11 wherein at least one A is an invasin domain.

25. A peptide immunogen of claim 11 wherein n is 3, and $(A)_3$ is (invasin domain)-Gly-Gly.

26. A peptide immunogen of claim 24 or claim 25 wherein said invasin domain has the amino acid sequence of SEQ ID NO:72.

27. A synthetic peptide of about 20 to about 100 amino acids, which comprises the amino acid sequences of
(a) an invasin domain,
(b) a helper T cell (Th) epitope, and
(c) a FAFSD target peptide comprising no more than 30 amino acids of the carbohydrate binding pocket of FimH, or a crossreactive and immunologically functional analog thereof, or a mimetope thereof.

28. A synthetic peptide of claim 27 of about 25 to 80 amino acids.

29. A synthetic peptide of claim 27 of about 25 to 65 amino acids.

30. A pharmaceutical composition comprising an immunologically effective amount of a target peptide immunogen of claims 3, 4, 5, 6, 7, 8, 9, 10, 11, 12,13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, or 29 and a pharmaceutically acceptable vaccine delivery vehicle.

31. A pharmaceutical composition comprising an immunologically effective amount of a target peptide immunogen of claim 26, and a pharmaceutically acceptable vaccine delivery vehicle.

32. A pharmaceutical composition of claim 30, wherein said immunologically effective amount of said peptide or peptide conjugate is about 0.25 μg to about 1 mg per kilogram body weight per dose.

33. A pharmaceutical composition of claim 31, wherein said immunologically effective amount of said peptide or peptide conjugate is about 0.25 μg to about 1 mg per kilogram body weight per dose.

34. A method for inducing anti-FAFSD peptide antibody production in a mammal by administering to said mammal a pharmaceutical composition of claim 30.

35. A method for inducing anti-FAFSD peptide antibody production in a mammal by administering to said mammal a pharmaceutical composition of claim 31.

36. A method for inducing anti-FAFSD peptide antibody production in a mammal by administering to said mammal a pharmaceutical composition of claim 32.

37. A method for inducing anti-FAFSD peptide antibody production in a mammal by administering to said mammal a pharmaceutical composition of claim 33.

38. A method for reducing adherence to the urinary tract mucosa of a mammal by type 1 fimbriated uropathogenic enterobacteriae to prevent urinary tract infection by administering to the mammal a pharmaceutical composition of claim 30.

39. A method for reducing adherence to the urinary tract mucosa of a mammal by type 1 fimbriated uropathogenic enterobacteriae to prevent urinary tract infection by administering to the mammal a pharmaceutical composition of

claim 31.

40. A method for reducing adherence to the urinary tract mucosa of a mammal by type 1 fimbriated uropathogenic enterobacteriae to prevent urinary tract infection by administering to the mammal a pharmaceutical composition of claim 32.

41. A method for reducing adherence to the urinary tract mucosa of a mammal by type 1 fimbriated uropathogenic enterobacteriae to prevent urinary tract infection by administering to the mammal a pharmaceutical composition of claim 33.

42. A method according to claim 34 wherein the enterobacteriae is E. coli.

43. A method according to claim 35 wherein the enterobacteriae is E. coli.

44. A method according to claim 36 wherein the enterobacteriae is E. coli.

45. A method according to claim 37 wherein the enterobacteriae is E. coli.

46. A polymer of at least two FAFSD peptides of claim 1 cross-linked by a bifunctional crosslinking agent.

47. A polymer of at least two FAFSD peptides of claim 2 cross-linked by a bifunctional crosslinking agent.

48. A polymer of at least two FAFSD peptide immunogens of claim 3 cross-linked by a bifunctional crosslinking agent.

49. A polymer of at least two FAFSD peptide immunogens of claim 4 cross-linked by a bifunctional crosslinking agent.

50. A polymer of at least two FAFSD peptide immunogens of claim 5 cross-linked by a bifunctional crosslinking agent.

51. A polymer of at least two FAFSD peptide immunogens of claim 6 cross-linked by a bifunctional crosslinking agent.